

# Adam T. (Ted) Bourgoyne Jr, P.E.

- BS (1966) & MS (1967) - LSU
- Ph.D. (1969) - University of Texas
- 45 Years Experience
- 29 Years at LSU
- Retired LSU - Dean of Engineering
- 12 Years – Tuscaloosa Trend Wells

# Drilling Engineering Review

- Regulatory Requirements for Drilling Permit
- Public Data Available for Wells near Geologic Prospect
- Helis Drilling Permit Application
- Proposed Unit Hearing (Docket No. 14-232) Exhibits
- Helis Drilling Program prepared by Seidel Technologies

# Regulatory Requirements for Drilling Permit

- LA Revised Statute 30:28
- Statewide Order 29-B:103

# LA Revised Statute 30:28

- Pay Drilling Permit Fee(s)
- Well Location Plat
- Hearing if Structure within 500'
- Commissioner issues Permit
- Commissioner promulgates regulations
  - Surface water quality
  - Ground water aquifer
  - 30 day "Pre-Entry Notice"

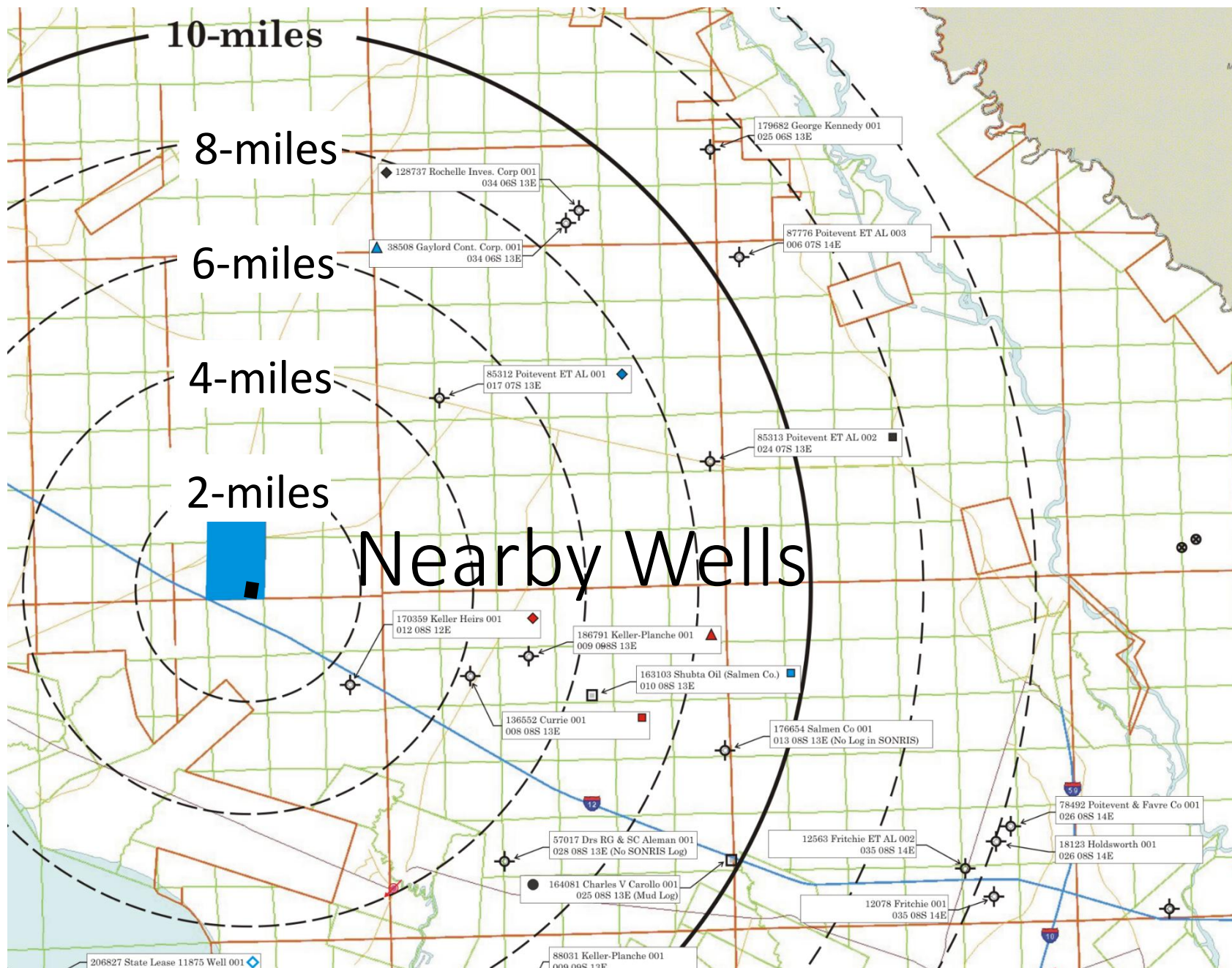
# Conservation Order 29-B:103

- Application on Form MD-10-R
- Location Plat Requirements
- Pre-Entry Notice
- Affidavit on Form AFLN-1
- Financial Security Requirement

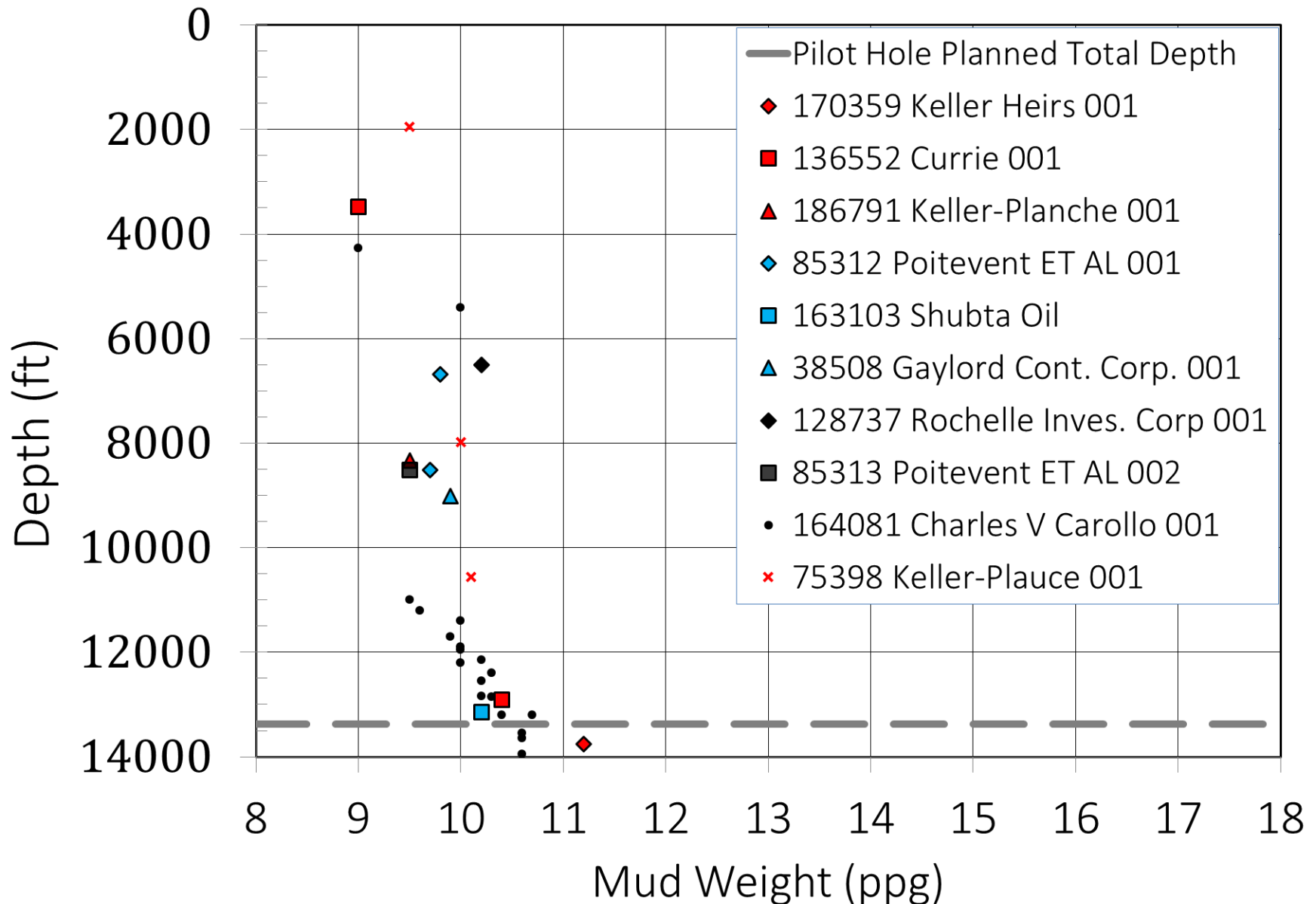
# Onshore Oil & Gas Permits, 2014

Month	Permits	TMS Permits
January	165	0
February	119	2
March	94	0
April	100	1
May	122	0
June	159	2
July	121	0
August	89	1

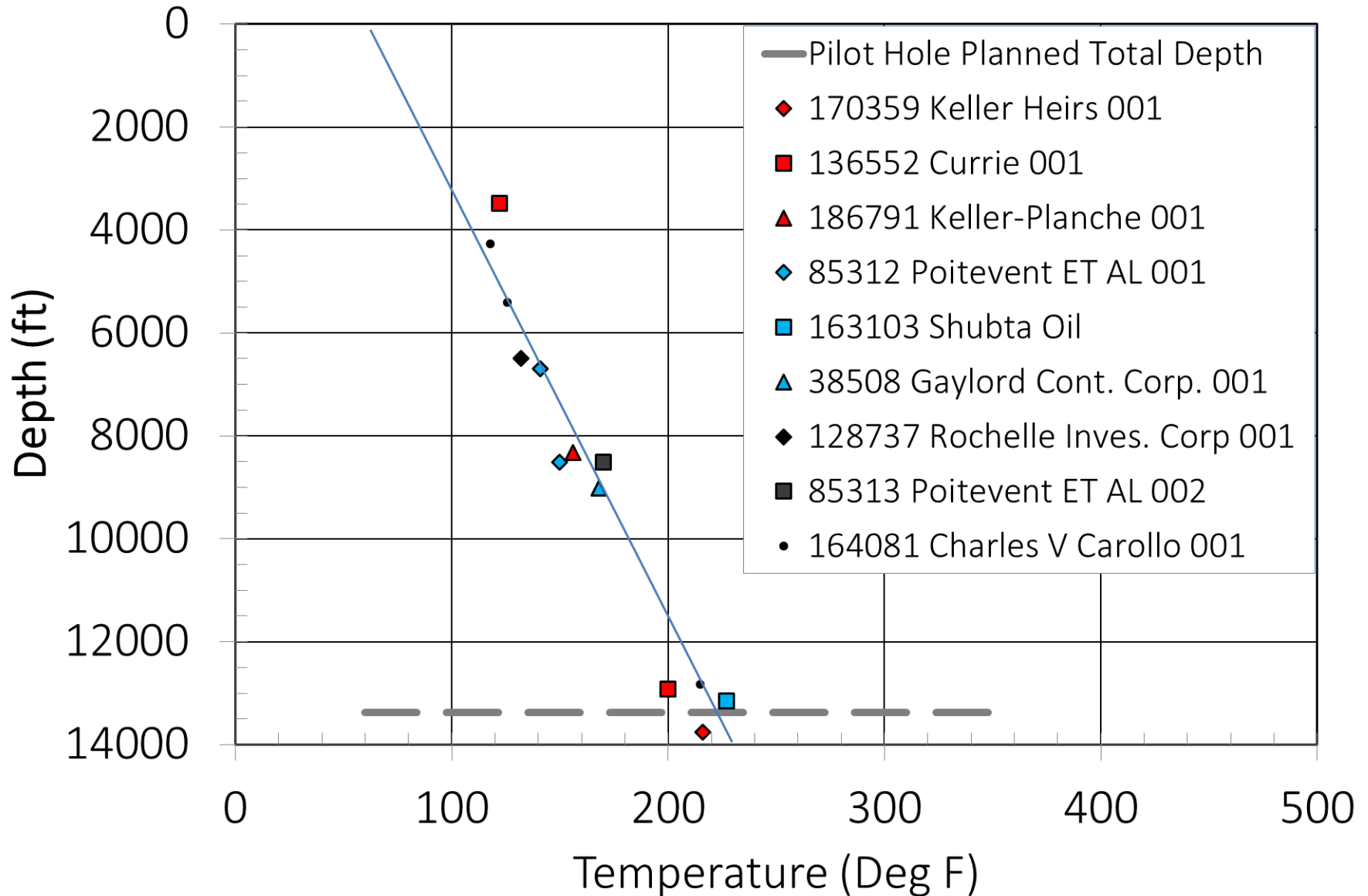
2 TMS Permits issued in September and 2 in October, 2014.

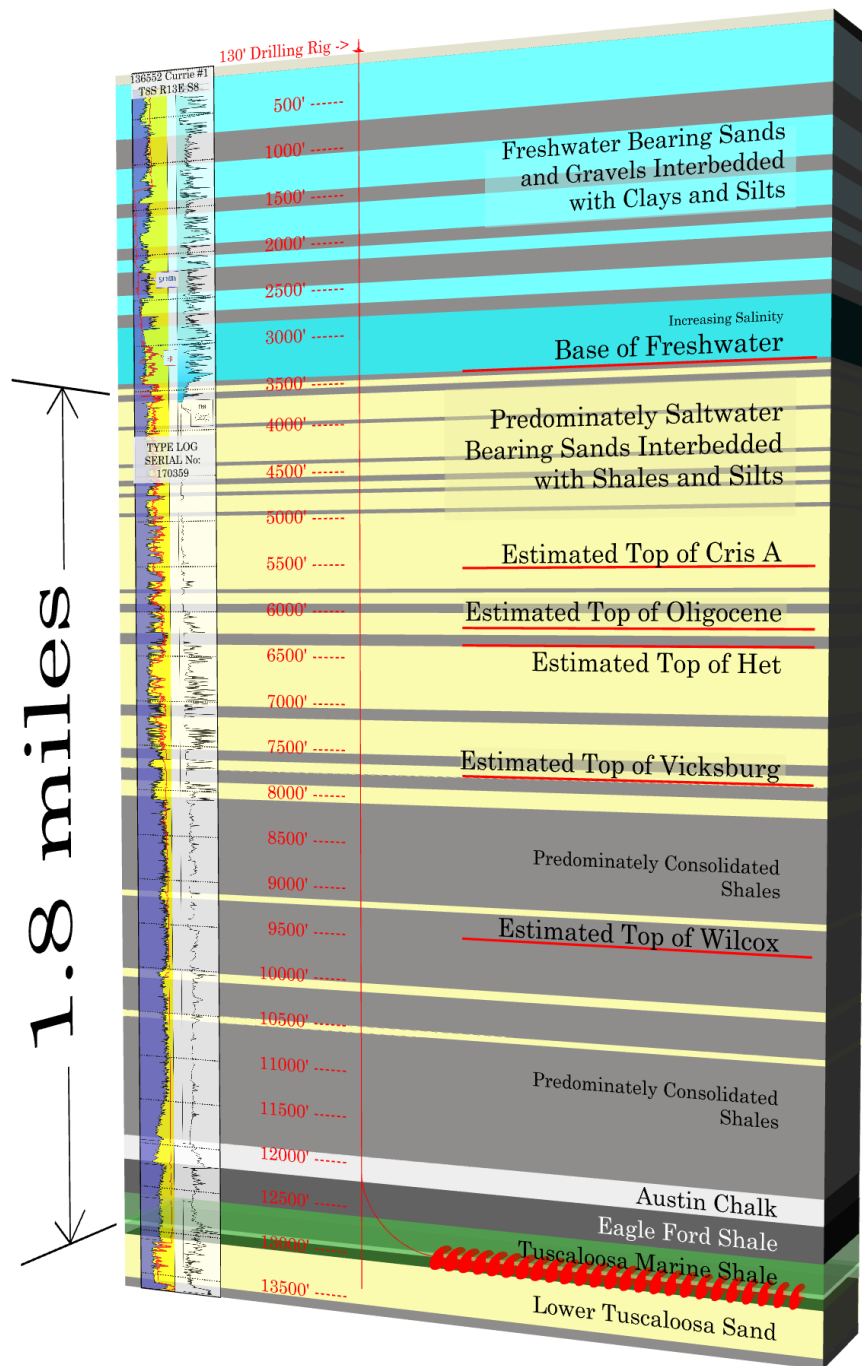


# Mud Weights used in Nearby Wells



# Temperature seen in Nearby Well



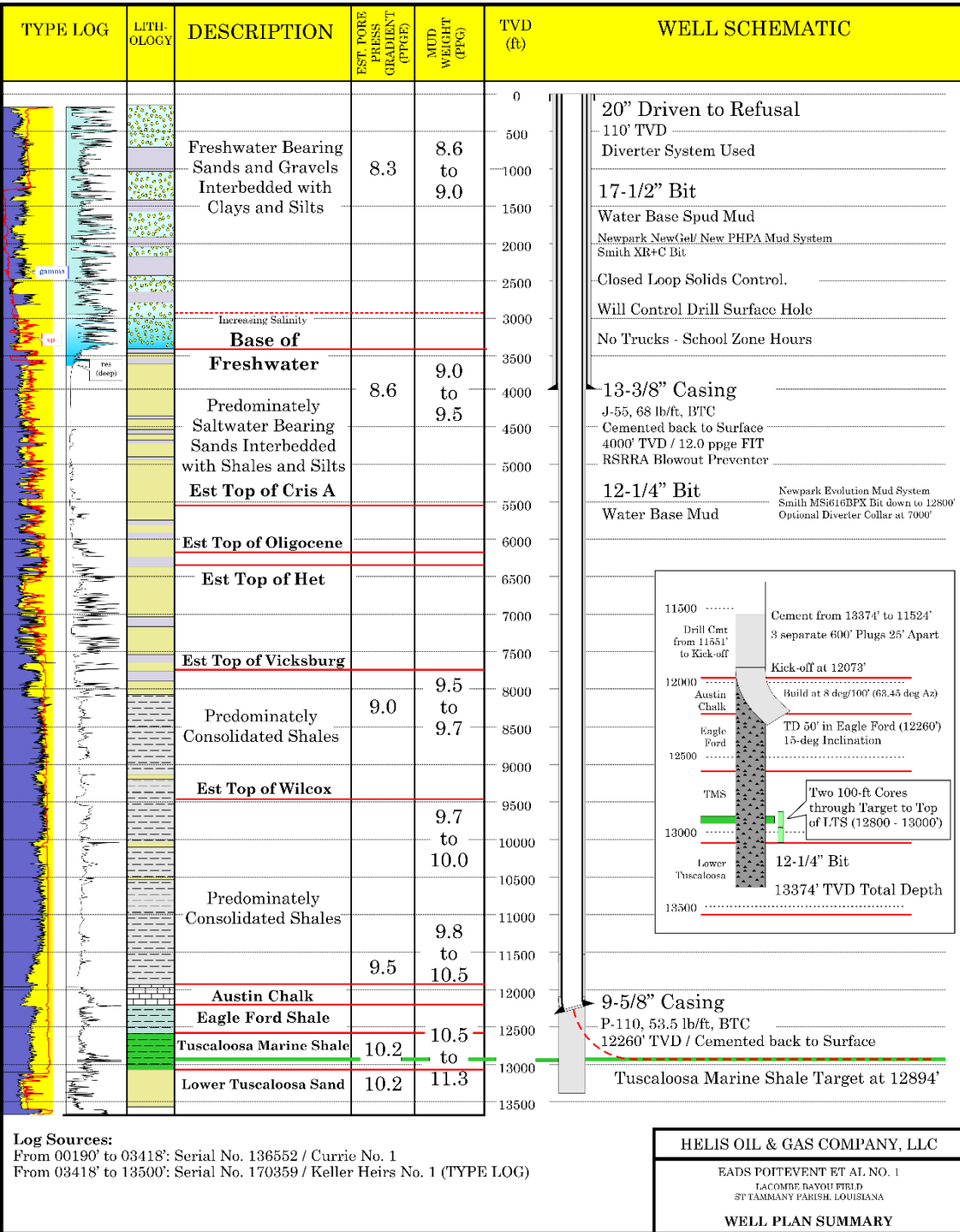


# TMS Prospect

- Not High Pressure
- Not High Temperature
- Low Permeability Target
- No Indication of H<sub>2</sub>S
- Aquifer protected by 3 Casing Strings
- Target within TMS at 12894'
- 1.8 miles below Aquifers
- About 5000' Lateral
- About 25 Fracture Stages
- Upward Frac Growth easy to detect, easy to stop

# Well Plan

- Preparations
- Surface Hole
- Pilot Hole
- Data Collection
- Set Plugs
- Intermediate Casing
- Release Rig

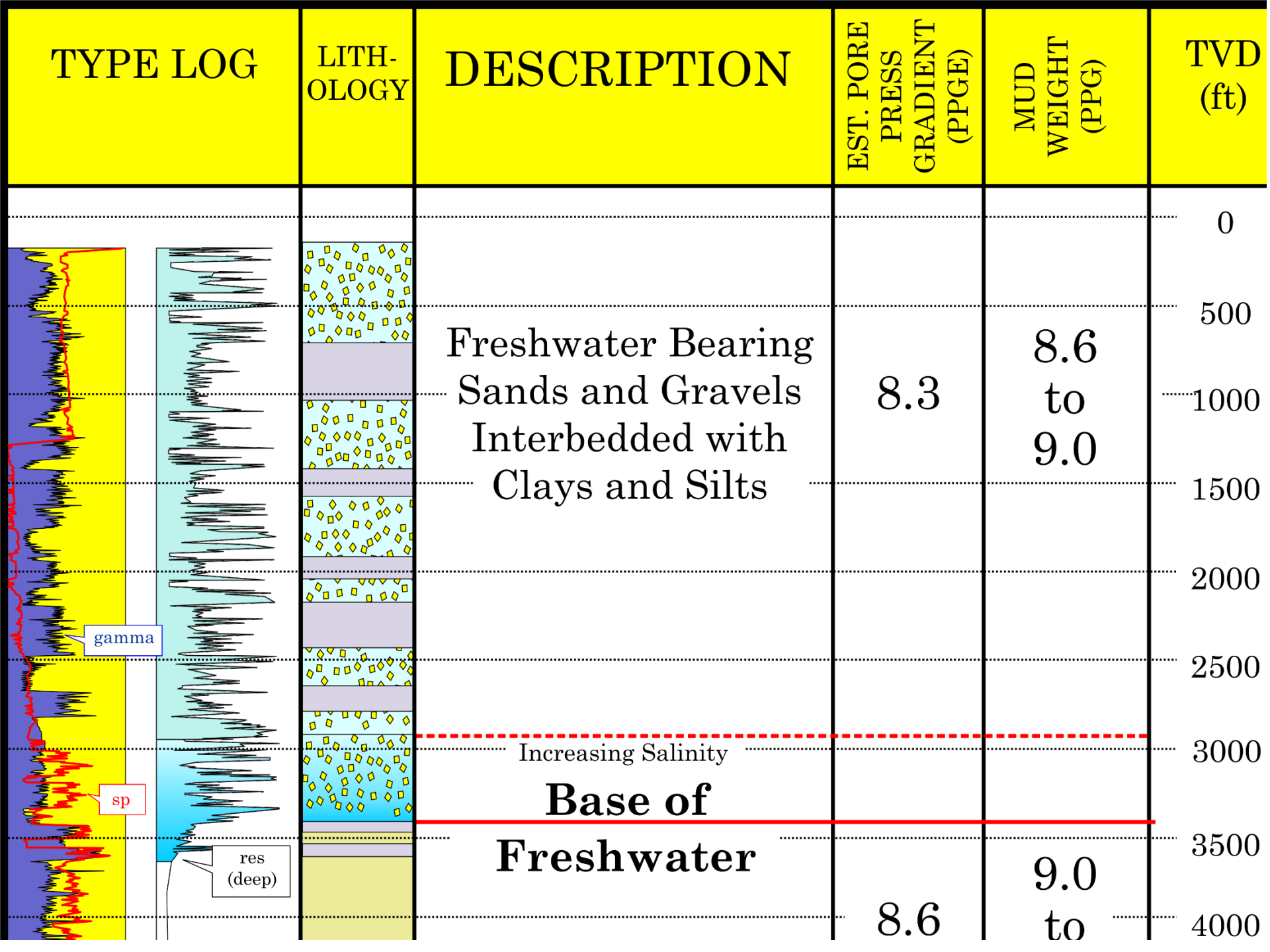


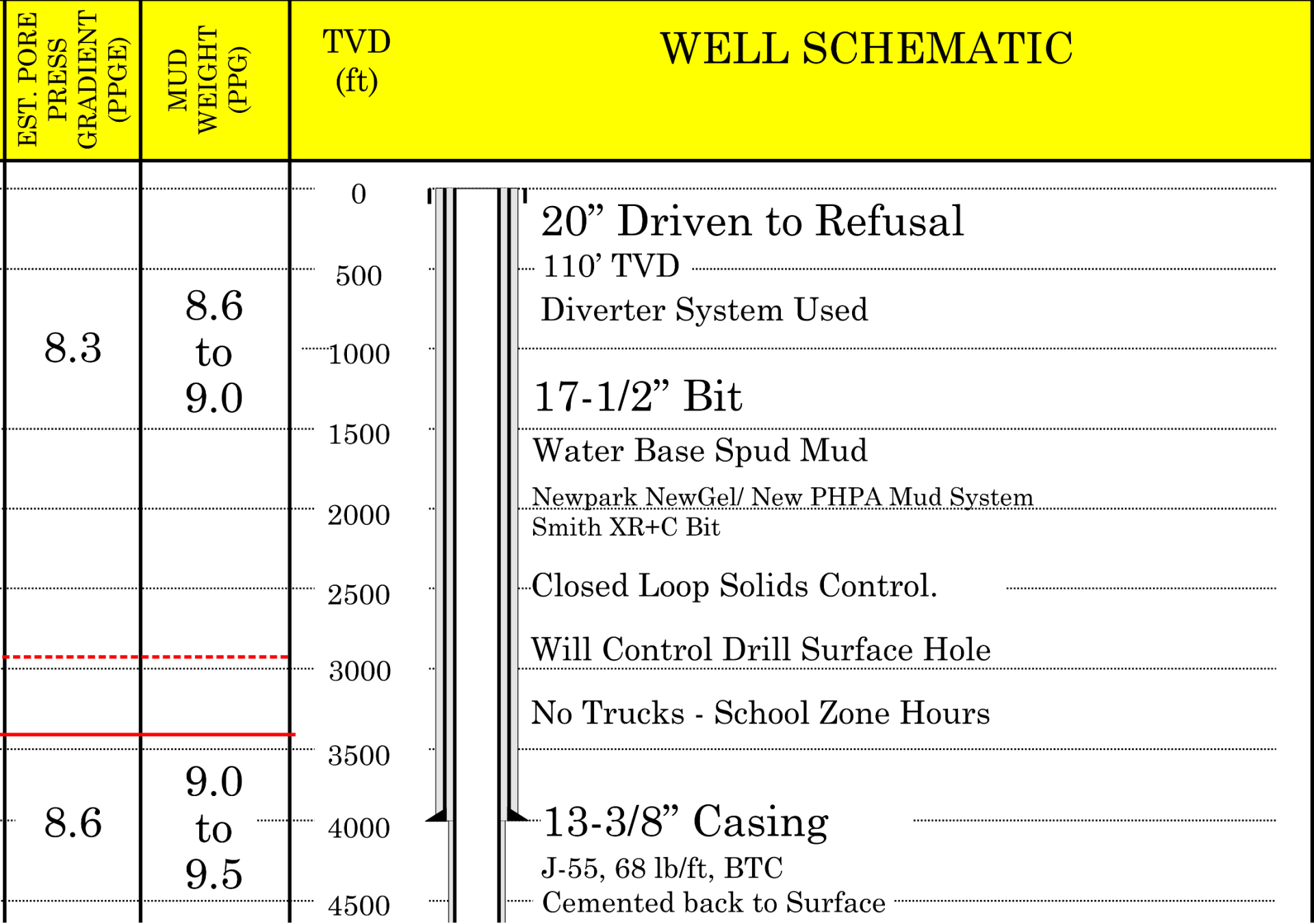
Log Sources:  
From 00190' to 03418': Serial No. 136552 / Currie No. 1  
From 03418' to 13500': Serial No. 170359 / Keller Heirs No. 1 (TYPE LOG)

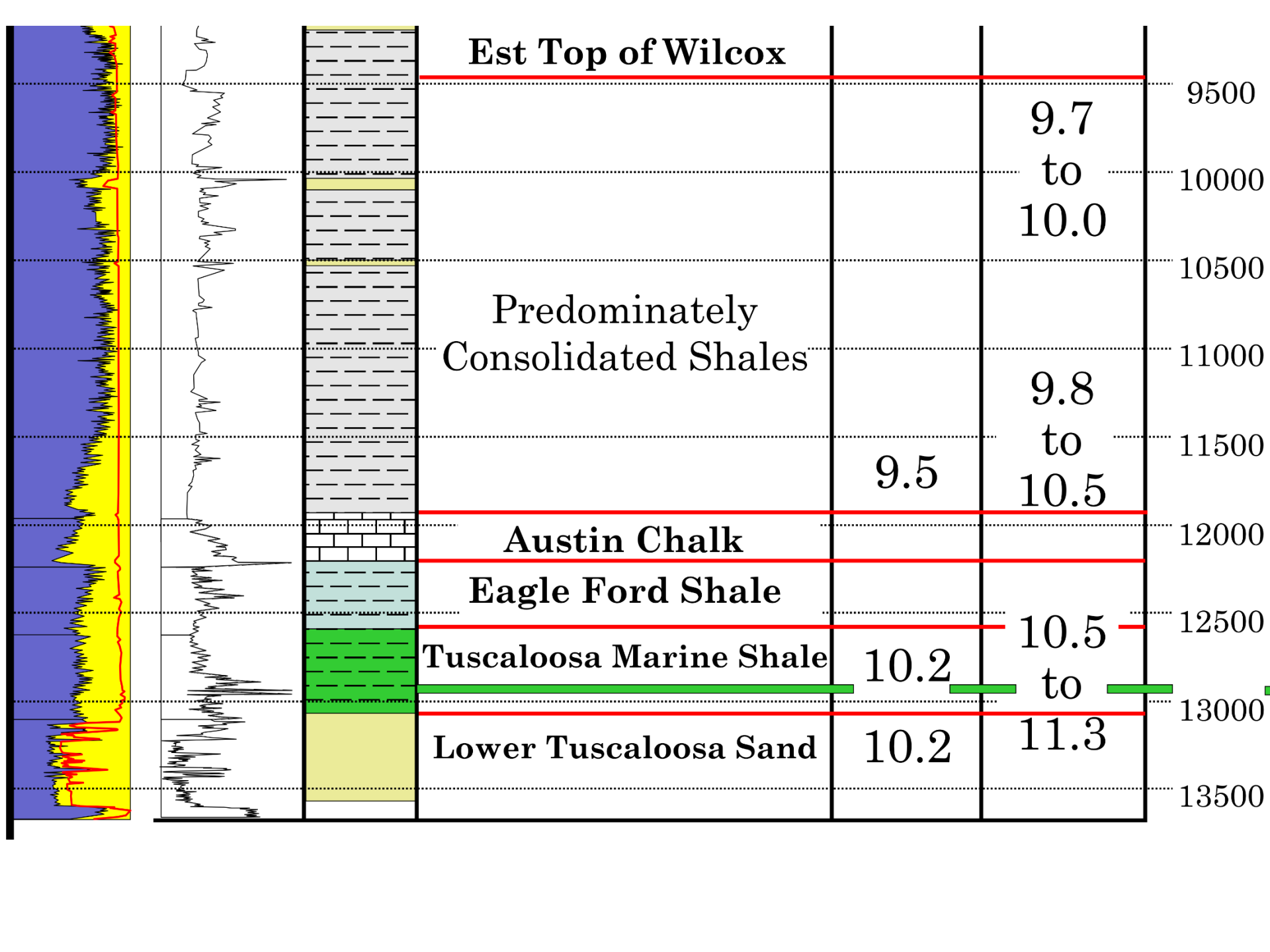
HELIS OIL & GAS COMPANY, LLC

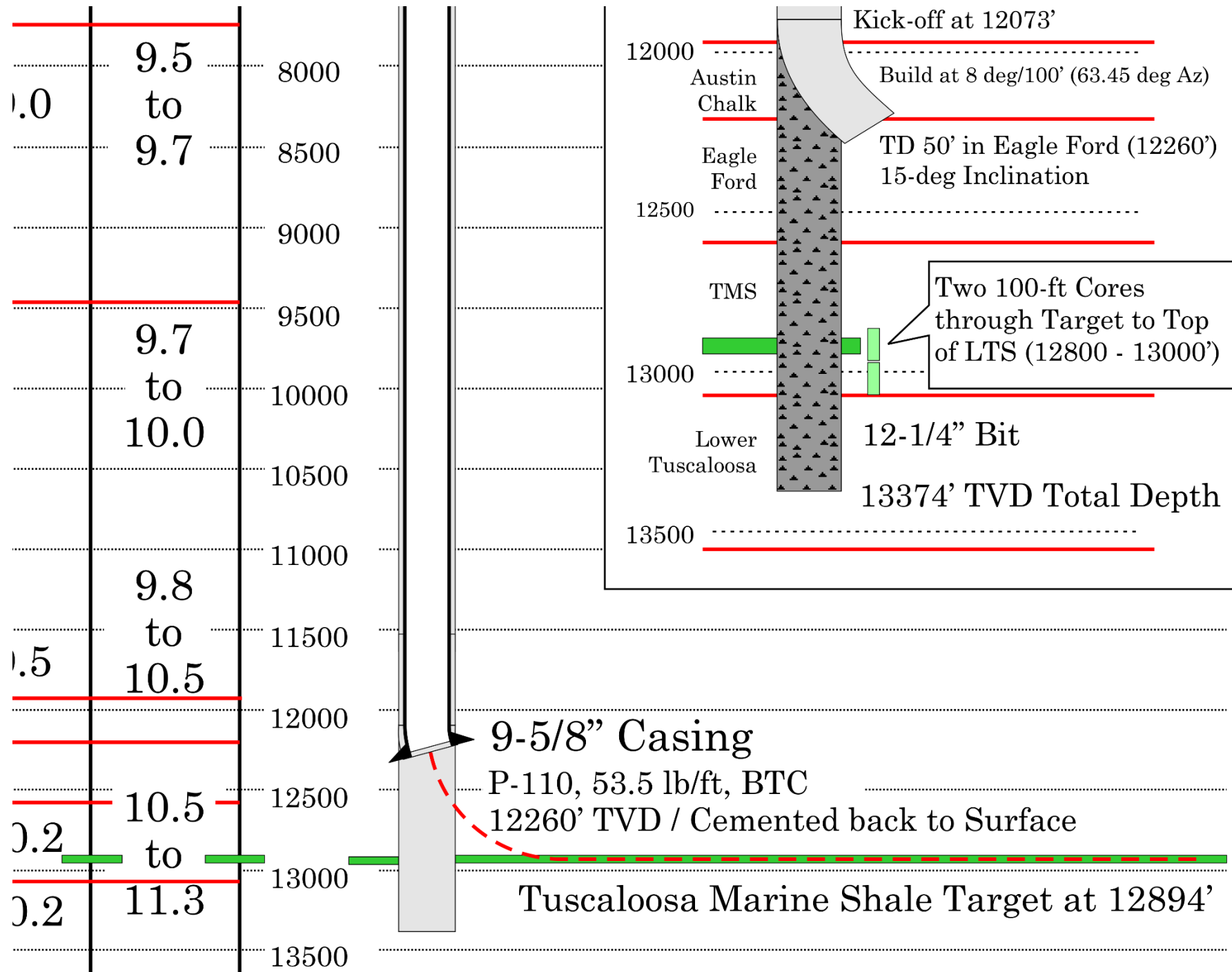
EADS POITEVENT ET AL. NO. 1  
LACOMBE DAYOU FIELD  
ST TAMMANY PARISH, LOUISIANA

WELL PLAN SUMMARY



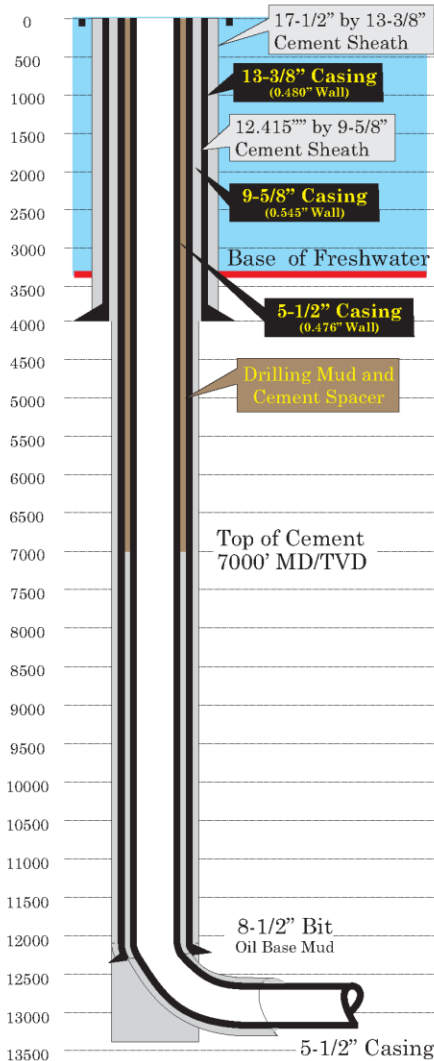






# Phase 2 Well Plan

## VERTICAL HOLE SECTION



## LATERAL HOLE SECTION

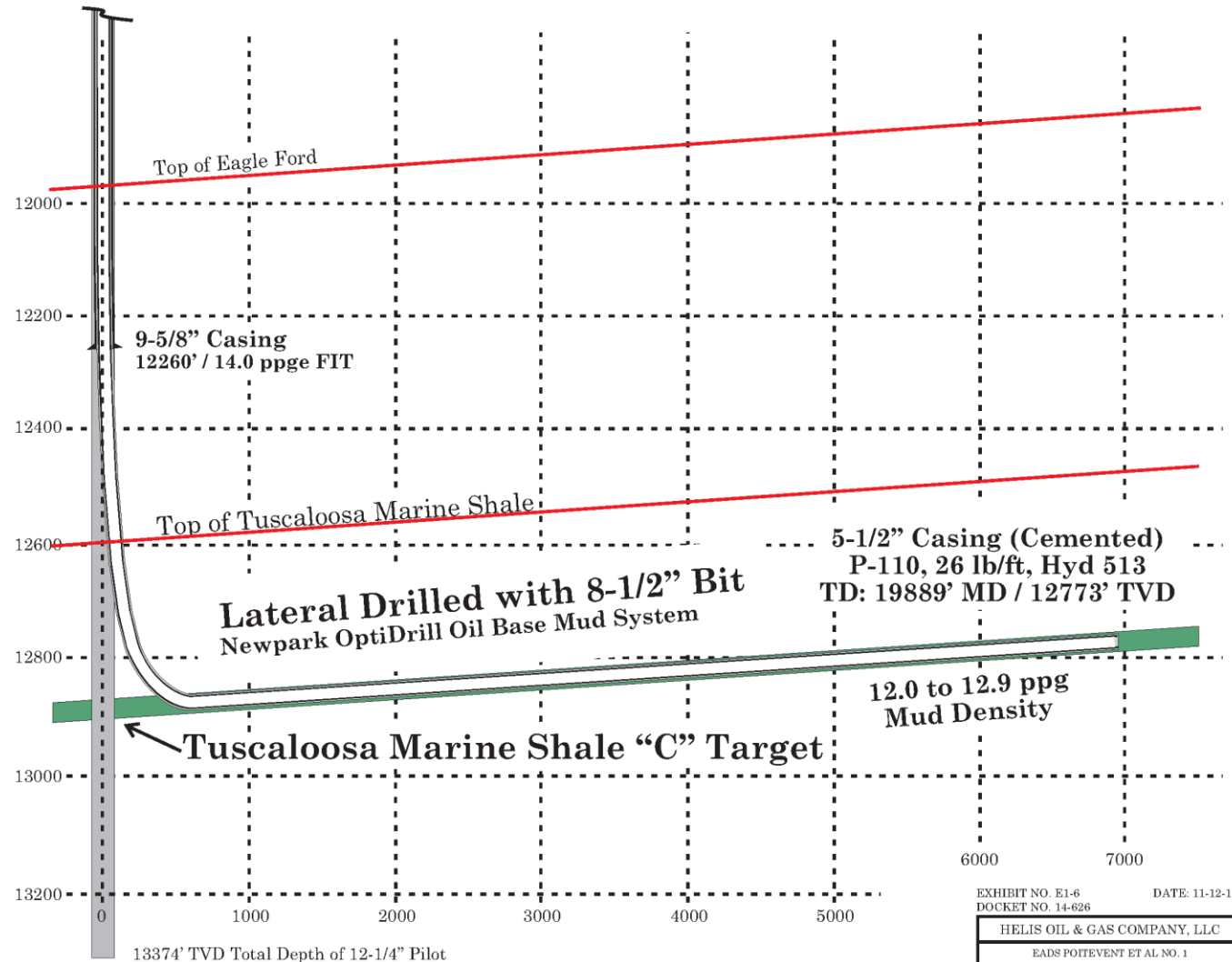
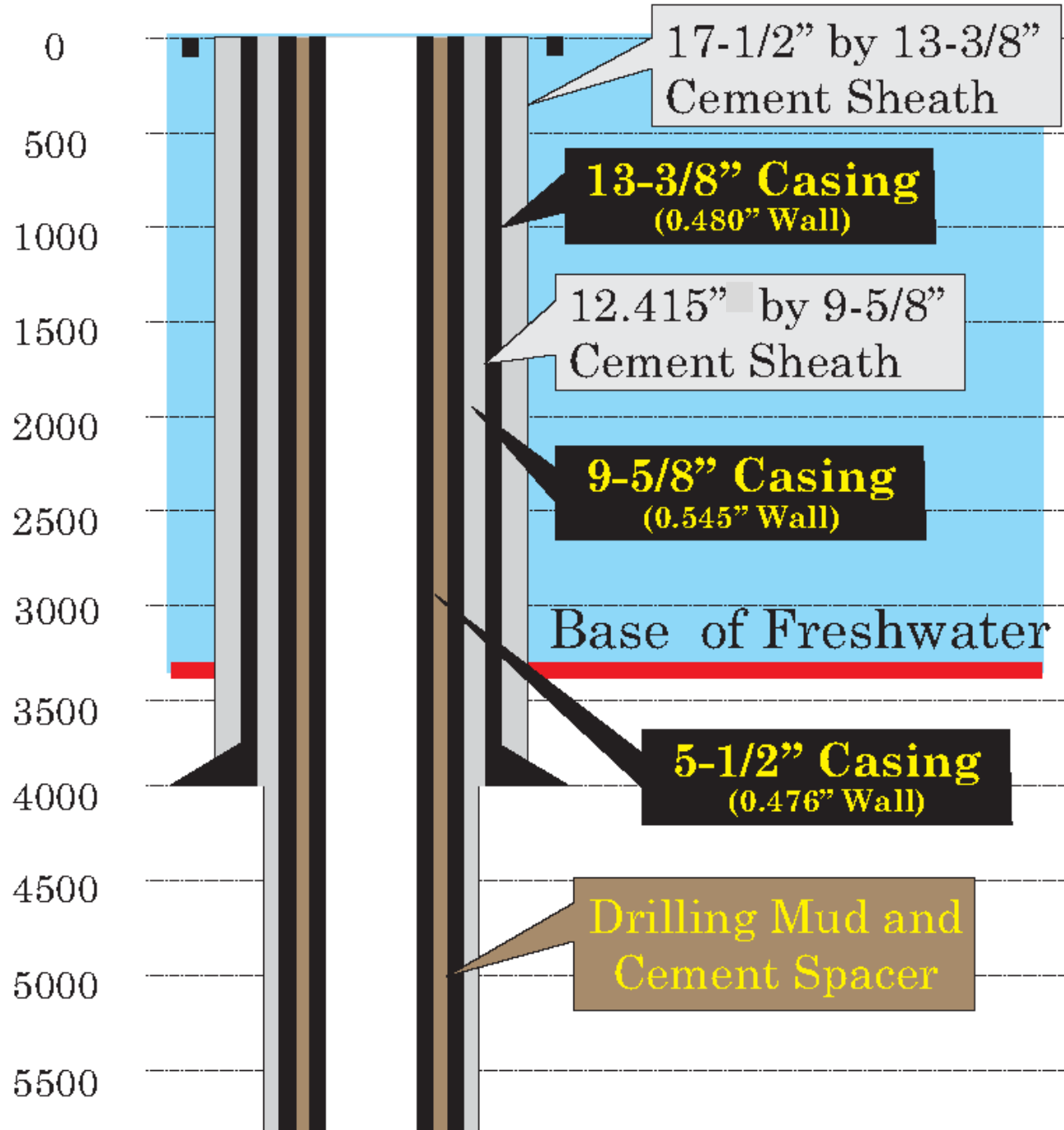


EXHIBIT NO. E1-6 DATE: 11-12-14  
DOCKET NO. 14-626

HELIS OIL & GAS COMPANY, LLC

EADS POTTEVENT ET AL NO. 1  
LACOMBE BAYOU FIELD  
ST TAMMANY PARISH, LOUISIANA

LATERAL SECTION SUMMARY

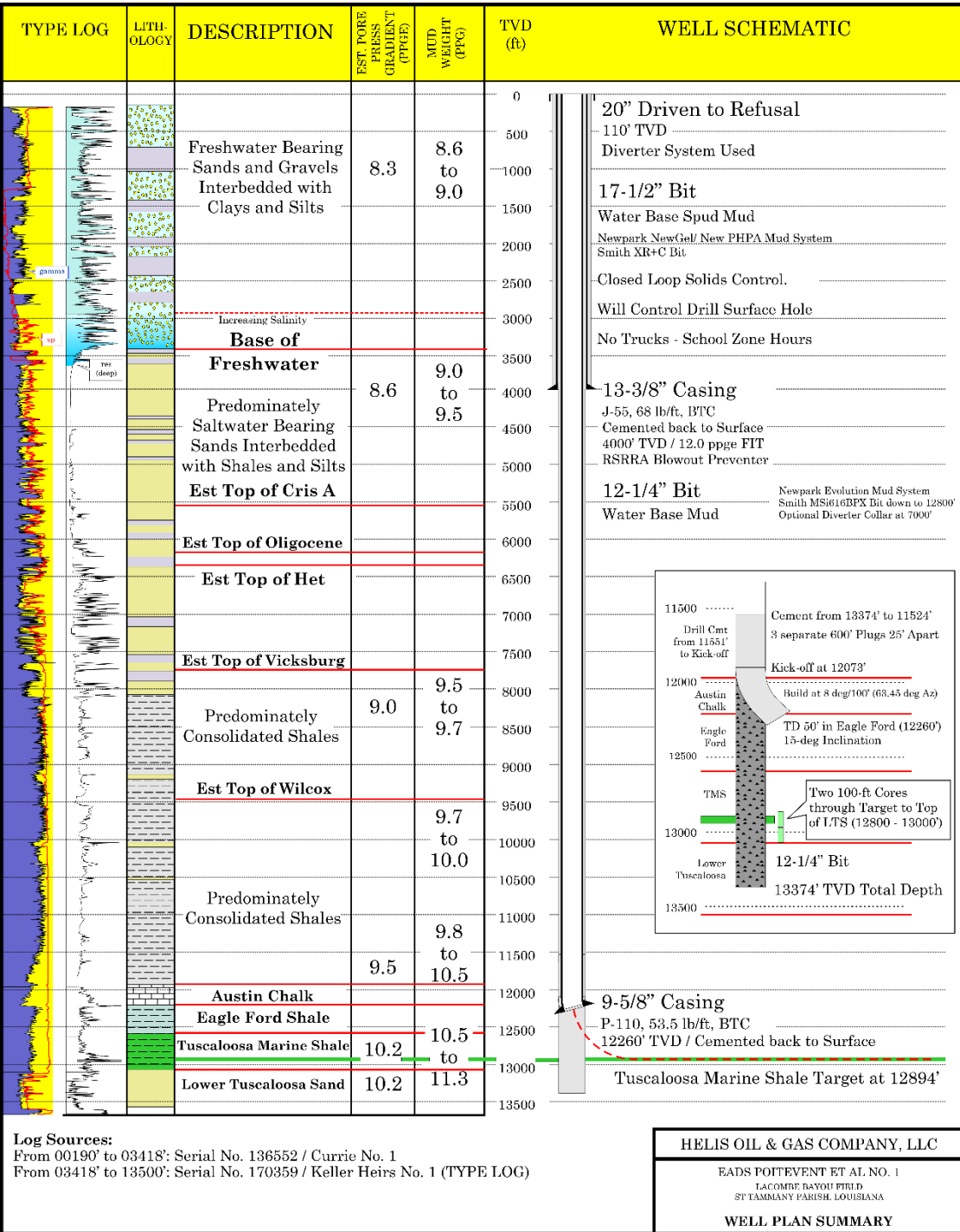


# Conclusions

- Helis has met Permit Requirements of 29B.
- Helis has operated in Louisiana for over 80 Years.
- Well Plan is based on Safe, Time-tested Drilling Practices and Best Available Technology for Protecting the Environment.
- Helis Well Planning and H-INC Contractor Audit Safety and Environmental Management System (SEMS) is designed to meet or exceed Requirements for Federal Leases.
- Helis has considerable Drilling Experience and has drilled similar Shale Prospect Wells in U.S.

# Well Plan

- Preparations
- Surface Hole
- Pilot Hole
- Data Collection
- Set Plugs
- Intermediate Casing
- Release Rig



# Preparations to Drill

- Prepare 3.21 Acre Surface Location
- Drive 20", 106.5 lb/ft Conductor to ~110'.
- Move in Rig Equipment
- Install & Inspect 20" Diverter System
- Pre-Spud Meetings
  - Drilling Program
  - Emergency Plan
  - Hurricane Plan
  - Trucking Plan
  - Well Control Training Refresher Plan

# Surface Hole

- Control Drill 17.5" hole to ~4000'.
- Run ~4000' of 13.375" Surface Casing.
- Cement Surface Casing to Surface.
- Wait on Cement 8 hrs.
- Nipple up & Test 13.625" BOP System.
- P/U 12.25" Bit & RIH & tag Cement.
- Drill out Cement to Float Collar.
- Pressure Test Casing to 1500 psi.

# Drilling Fluid for Surface Hole

## ~ 95% Fresh Water

Product name	Product Description	Concentration
NewGel	Wyoming Bentonite	10 - 20 ppb
NewBar	Barium Sulfate	As needed for slugs
NewPHPA	Partially Hydrolyzed Polyacrylamide	0.25-0.75 ppb
DynaDet	Drilling Detergent	As needed
SAPP	Sodium Acid Pyrophosphate	As needed
DynaFiber	Micro Cellulose Fiber	As needed for sweeps
NewBridge	Granular and Fibrous Blend	As needed for sweeps
NewPlug	Ground Walnut Hull	As needed for sweeps

# Pilot Hole to Evaluate TMS

- Drill Casing Shoe & 10' New Formation.
- Perform FIT to 12.0 ppg EMW.
- Drill ahead; Start Mud Log at ~5000.'
- Drill to Core Point (~12,800').
- Take two 100' Cores.
- P/U 12.25" Bit and BHA.
- RIH and drill to TD at ~13,374.'

# Gather Petrophysical Data

- Make Wiper Trip; Condition hole.
- Run 1: Quad Combo.
- Run 2: FMI and Sonic Scanner.
- Make Wiper Trip; Condition hole.
- Run 3: MDT for Pressure & Fluid.
- Run 4: Take 60 Sidewall Cores.

# Plug Pilot Hole

- Pick up Tubing Stinger; RIH to 13,374'.
- Set 600' Balanced 16.4 ppg Cement Plug.
- Pull Stinger 25' above Cement; Circulate 1.5 hole volumes.
- Set 600' Balanced 17.2 ppg Cement Plug.
- Pull Stinger 25' above Cement; Circulate 1.5 hole volumes.
- Set 600' Balanced 17.2 ppg Cement Plug.
- Pull Stinger 300' above Cement. Circulate 1.5 hole volumes.
- Wait on Cement 24 hrs.; POOH to Surface.

# Review Results of Preliminary Petrophysical Analysis

- If Prospect not Viable, Submit Plan & Obtain Approval to Plug and Abandon Well.
- If Prospect Warrants further Analysis, Run Intermediate Casing.

# Run Intermediate Casing

- Pick up 12-1/4" Bit and BHA.
- Dress off cement to KOP at ~12,073.'
- Pick up 12-1/4" directional BHA and RIH.
- Kick off at 8°/100' to TD at 15° Inclination & 63.45° Azimuth; Be 50' into the Eagle Ford Shale at ~12,260' MD/12,258' TVD.
- Make Wiper Trip; Condition Hole; POOH.
- Run 12,260' of 9-5/8" Casing.

# Cement Casing & Release Rig

- Cement Casing to Surface.
- Wait on Cement 24 Hours.
- Nipple down Blowout Preventer and Nipple up Temporary Abandonment Tree.
- Release and Move out Rig.

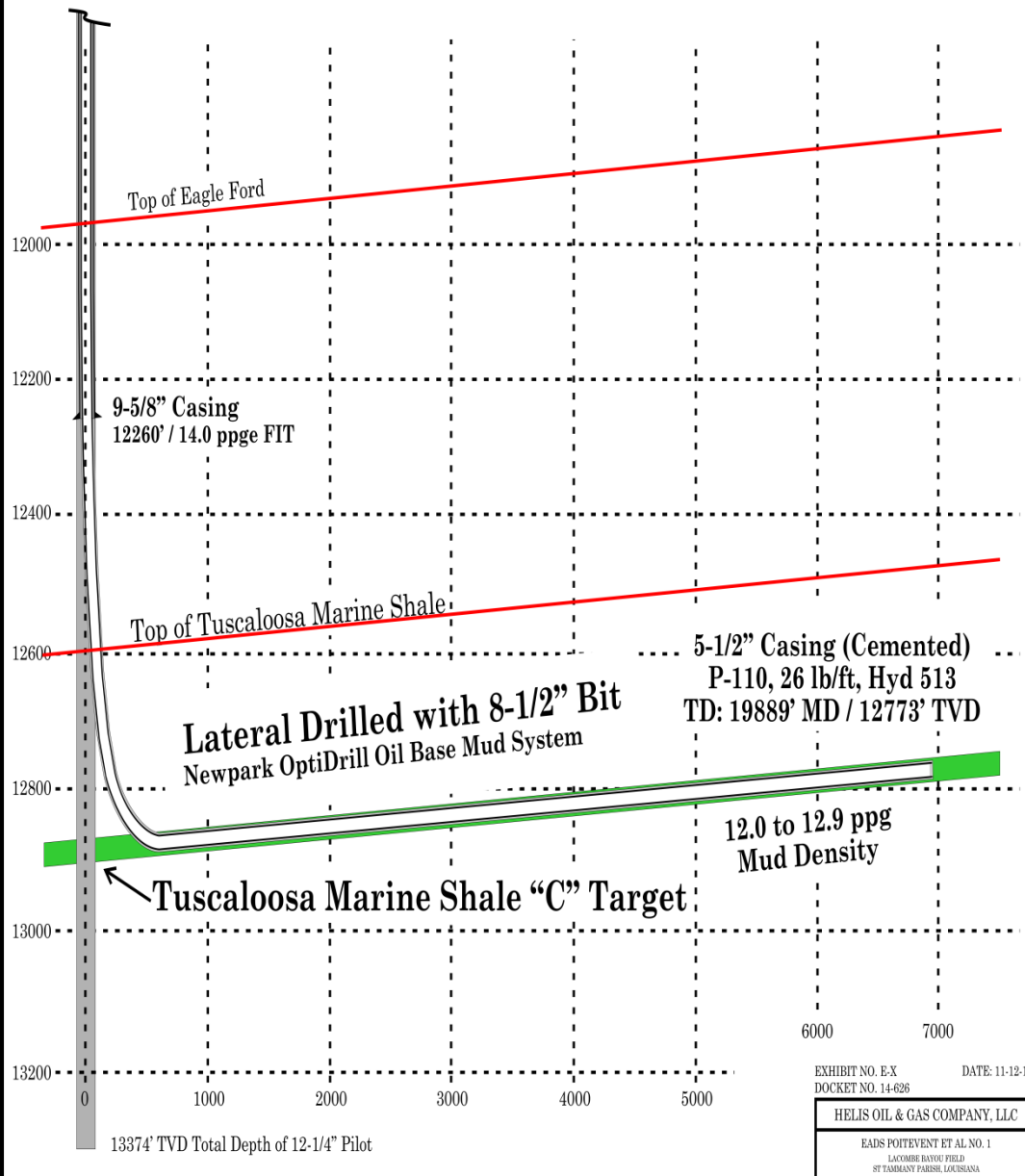
# Detailed Prospect Evaluation

- Well Log Analyses
- Lab Analyses of Rock Samples
- Lab Analyses of Fluid Samples
- Detailed design of Frac Job
- Future Production Estimates
- Finalize Phase 2 Well Plan

# Prepare to Drill Lateral

- Move in Rig
- ND Tree; NU & Test BOP Stack
- PU 8.5" Bit & BHA; Drill cement to FC
- Displace WBM with Oil Base Mud
- Pressure test Casing to 2700 psi
- Run Cement Bond Log
- Drill out Shoe & 10' New Formation
- Perform FIT to 14 ppg EMW

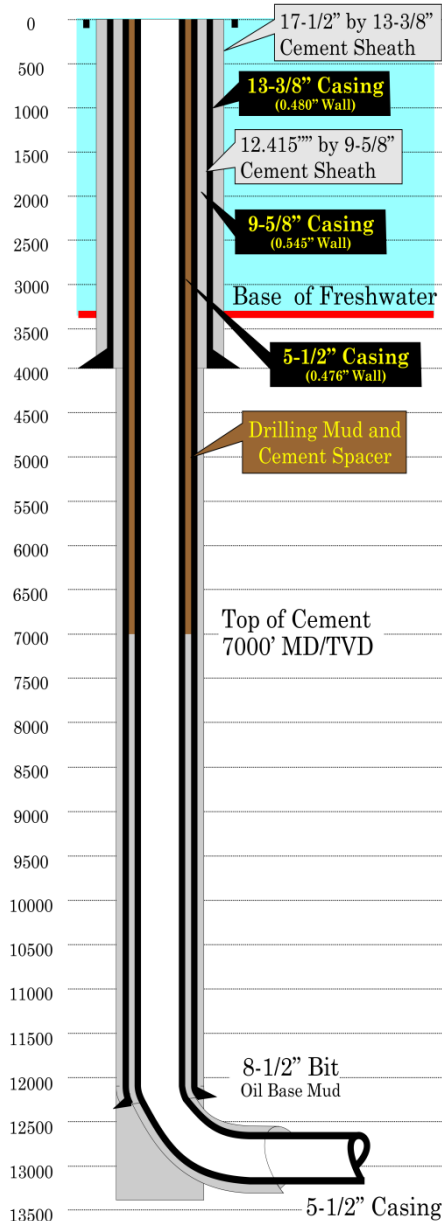
## LATERAL HOLE SECTION



# Drill Lateral & Run Casing

- Drill Lateral as per Directional Plan.
- Drill to 19,889' MD/12,773' TVD.
- Clean and Condition Hole.
- Run 5-1/2" Production Casing to TD.
- Cement Casing with TOC at 7000.'
- Run Cement Bond Log.
- ND BOP; NU Tree; Release Rig

## VERTICAL HOLE SECTION

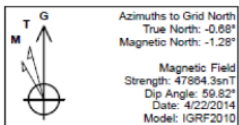


# Perform Fracture Stimulation

- Move in and Rig up Frac Equipment
- Pressure Test Lines and Equipment.
- Perform 25 Stage Frac Treatment.
  - Perforate
  - Pump Frac Fluid & Proppant for Stage
  - Set Plug
  - Repeat 25 times
- RD & Release Frac Equipment

# Perform Flowback Test

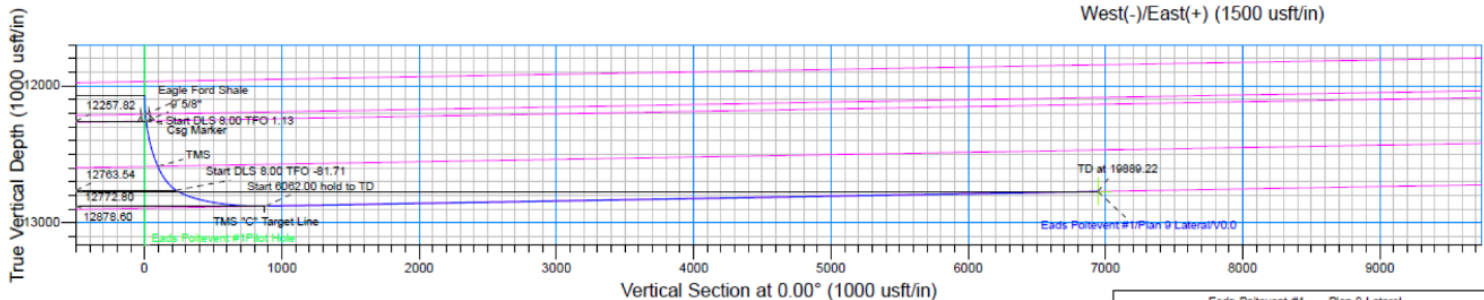
- Move in and RU Coil Tubing.
- Move in & Rig up Well Test Service.
- Drill out Plugs.
- Release Coil Tubing.
- Test Well.
- Release Well Test Service.



Company: Helis Oil & Gas Company, LLC  
Field: St. Tammany Parish, LA  
Location: Eads Poitevent #1  
Well: Eads Poitevent #1  
Wellbore: Lateral  
Plan: Plan 9 Lateral  
Rig: Original Well Elev

**PATHFINDER**  
A Schlumberger Company

WELL DETAILS: Eads Poitevent #1									
+N/-S		+E/-W		Ground Level:		WELL @ 0.00usft (Original Well Elev)		Longitude	
0.00		0.00		Northing		Easting		Latitude	
				628309.00		2427211.00		30° 23' 15.056 N	
								89° 58' 42.251 W	
FORMATION TOP DETAILS									
TVDPath		MDPath		Formation					
5522.00		5522.00		Cris A Top					
6173.00		6173.00		Oligocene Top					
6344.00		6344.00		Heterostegina Top					
7744.00		7744.00		Vicksburg					
9468.00		9468.00		Wilcox					
11970.00		11970.00		Austin Chalk					
12207.90		12208.71		Eagle Ford Shale					
12257.81		12259.93		Csg Marker					
12589.32		12649.60		TMS					
12876.76		13816.20		TMS "C" Target Line					
DESIGN TARGET DETAILS									
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude		
PBHL	12772.80	6945.00	876.00	635254.00	2428087.00	30° 24' 23.695 N	89° 58' 31.311 W		
SECTION DETAILS									
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSecl
1	12073.00	0.00	0.00	12073.00	0.00	0.00	0.00	0.00	0.00
2	12259.64	14.95	63.45	12257.82	10.84	21.70	8.00	63.45	10.84
3	13005.36	74.57	64.46	12763.54	228.77	473.42	8.00	1.13	228.77
4	13827.22	91.00	0.00	12878.60	893.92	876.00	8.00	-81.71	893.92
6	19889.22	91.00	0.00	12772.80	6945.00	876.00	0.00	0.00	6945.00
CASING DETAILS									
TVD		MD		Name		Size			
4000.00		4000.00		13 3/8"		13-3/8"			
12257.82		12259.64		9 5/8"		9-5/8"			



Eads Poitevent #1 Plan 9 Lateral  
Created By: Jenise Kirkpatrick Date: 12-47, October 10 2014

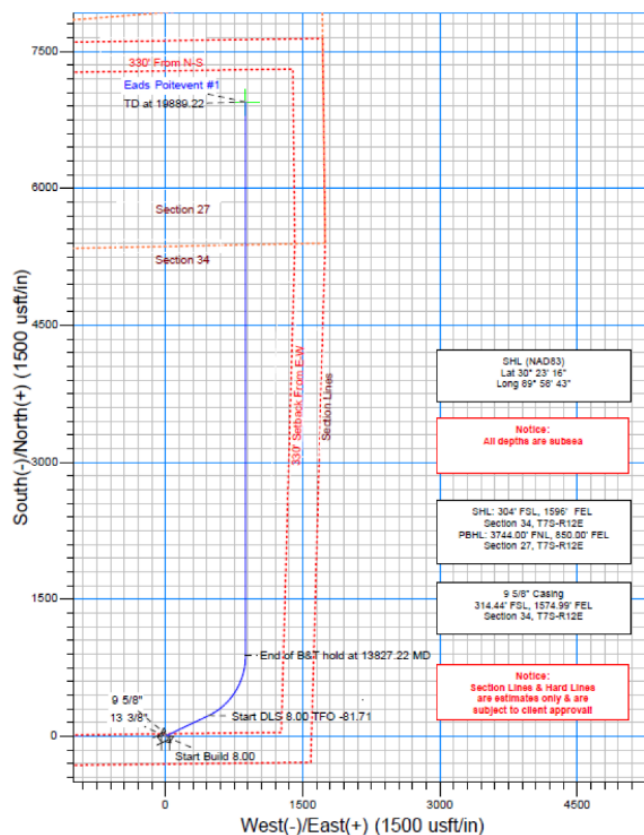
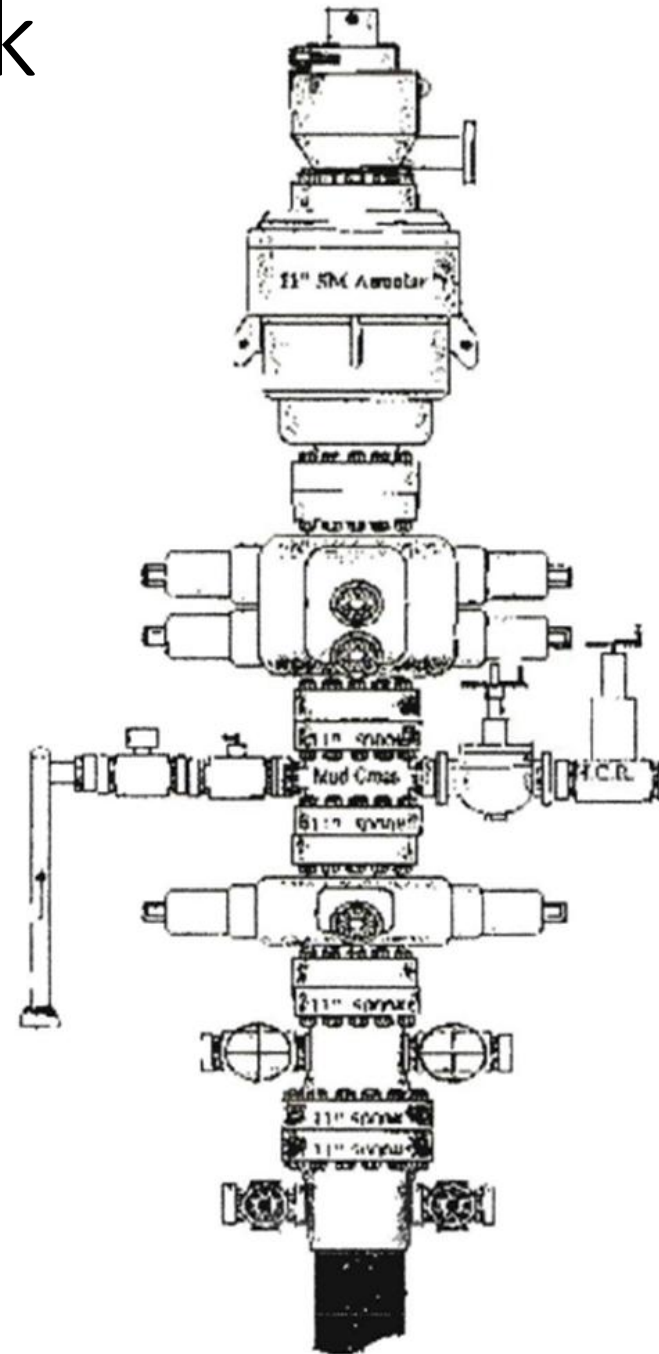


Exhibit C: Lateral Hole Directional Plan



# BOP Stack

- 1) 13 5/8" slip-on / welded x 13-5/8" 10,000 psi casing head
- 2) One (1) 13 5/8" 10000 psi WP drilling spacer spool with 2 side outlets for 3" kill line and minimum 3" choke line.
- 3) One (1) 13 5/8" x 10,000 psi WP Type "U" single-ram preventer with Preventer with 3 1/2" x 5" Flex Rams(variable) installed in bottom pipe rams
- 4) 13 5/8" 10M x 13 5/8" 5M Mud Cross with outlets for kill and choke lines
  - a) 10M Kill Line, consisting of two (2) each 10M manual gate valves (3" minimum bore) on inside, next to Mud Cross, plus one (1) each 10M check valve (3" minimum bore) installed on outside of manual gate valves
  - b) 10M Choke Line, consisting of one (1) each 10M manual gate valve (3" minimum bore) on inside, next to Mud Cross, with one (1) each 10M hydraulic operated (HCR) gate valve (3" minimum bore) installed outside of the 10M manual gate valve, with 10M flanged choke line (3" minimum bore) extending from HCR valve to inlet flow cross of 5M choke manifold.
  - c) 10M Choke Manifold, 4-1/16" 10M x 3-1/16" 10M, configured to conform with both requirements
- 5) One 13 5/8" 10,000 psi WP double-ram preventer with one (1) set of blind rams on bottom with (1) set of variable pipe rams on top, complete with hand wheels and extension arms.
- 6) One 13-3/8" x 5,000 psi WP Hydril GK (or equivalent) annular preventer.
- 7) Williams Model 9000 Low pressure rotating head



# Auxiliary Equipment to be Used (10,000 psi System)

- 1) Upper & Lower Kelly cock valves with handles available.
- 2) Safety valve and subs to fit drill pipe on rig floor.
- 3) Choke manifold for 10,000 psi system with 2 chokes. (pressure gauges on manifold)
- 4) Two (2) kill lines (3" minimum, one remote to end of Substructure) both with 3" kill line full open valve, plus a check valve for each line.
- 5) Minimum 3" choke line
- 6) Two (2) choke line gate valves, 3" minimum, with one choke line gate valve being hydraulically operated manual.
- 7) Two (2) chokes (1 remote, 1 manual) on choke manifold.
- 8) Fill-up Line above uppermost preventer
- 9) Wear Bushing or Bowl Protector in casing head.
- 10) Inside BOP or (float Sub) available
- 11) All BOPE connections subject to well pressure shall be flanged, welded or clamped.
- 12) Choke line shall be straight lines unless turns use a tee blocks or are targeted with running tees, and shall be anchored to prevent whip and reduce vibration.

# Blowout Preventer Equipment Testing

- The wellhead BOP equipment will be nipped-up on the 13-5/8" - 10,000 psi WP casing head prior to drilling out from under surface casing.
- All ram preventers and related equipment will be tested to 10,000 psi for 10 minutes.
- Annular preventers will be tested to 70% of rated working pressure for 10 minutes.
- Surface casing will be tested to 1500psi for 30 min with no more than 10% pressure loss in 10 minutes.
- All preventers and surface casing will be tested before drilling out of surface casing.
- BOP equipment will be visually inspected daily and tested within 14 days of previous test, and after any repairs are made to the BOP equipment.
- Annular preventers will be functionally operated at least once per week. Pipe rams will be activated daily and blind rams shall be activated each trip or at least weekly.
- Notified regulatory agency 24 hours in advance of testing of BOPE
- Record name of government personnel contacted and time & date of notification on reports.